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December 13, 1991

Conference Chairman
RD/RA Conference '92
U.S. Environmental Protection Agency
HSCD-DCMB (OS-220W)
Washington, DC 20460

Subject: Abstract -- Remedial Design of a Landfill Cover in a Flood Plain: Bowers Landfill

Dear Sirs:

Please consider the enclosed abstract for presentation at the 1992 Conference on Remedial Design and Remedial Action at Hazardous, Toxic, and Radiological Waste Sites. We believe that our experience at the Bowers Landfill Superfund site would make a useful contribution to the session on "Remedial Design Problems and Solutions."

Sincerely,

A handwritten signature in cursive script that reads "John Dirgo".

John Dirgo
Environmental Scientist

cc: ✓ David Wilson, U.S. EPA Region 5
PRC Distribution

REMEDIAL DESIGN OF A LANDFILL COVER IN A FLOOD PLAIN: BOWERS LANDFILL

Presented by: John Dirgo, Bhupen Gandhi, Donna Stroka, and Andrew Suminski, PRC Environmental Management, Inc., and David Wilson, U.S. Environmental Protection Agency, Region 5

BACKGROUND: The Bowers Landfill Superfund Site is located near Circleville in rural Pickaway County, Ohio. The landfill was constructed in the 1960s as a berm approximately 3,500 feet long and approximately 10 feet high with an average width of 125 feet. The landfill lies within the Scioto River flood plain and its northwestern and southern points abut the river. The north and west sides of the landfill are bordered by agricultural fields containing clay and topsoil borrow materials that will be used to construct a new landfill cover. The landfill and surrounding areas are subject to frequent flooding. During 1990, the year remedial design field activities took place, the site flooded ten times. U.S. EPA's Record of Decision for the site, signed in March 1989, recognizes this problem. In addition to installation of a low-permeability clay cover, the ROD requires construction of erosion control and flood protection measures and drainage improvements.

ANALYSIS: The frequent floods at Bowers Landfill present unique design challenges. The fields adjacent to the landfill, which will be used as a source of cover materials, can be submerged for long time periods after flooding, potentially delaying construction activities. In addition, flooding during construction could wash out the new landfill cover and waste materials from exposed portions of the landfill. Finally, long-term operation and maintenance of the landfill is also affected by flooding, making access to the site and monitoring wells difficult and affecting the durability and permanence of remedial action construction components.

SOLUTIONS: The final remedial design for Bowers Landfill includes several elements to overcome the short-term and long-term effects of flooding:

- A temporary portable dam (consisting of vinyl fabric stretched over A-frame structural supports to hold back water) will be installed along the Scioto River and the northern side of the landfill during construction activities. The dam will protect the landfill and borrow areas from flooding and minimize construction delays. The cost of installing the dam is approximately equal to the costs associated with expected construction delays from flooding.
- The borrow area adjacent to the landfill will be regraded and allowed to develop as a wetlands, providing additional storage capacity for flood waters, as well as a habitat for wildlife.
- Permanent sheet piles will be installed at the northwestern and southern ends of the landfill to provide erosion protection for these two critical locations.
- The landfill side slopes will be covered with a soil reinforcing net to be installed below the topsoil. The soil over the net will be seeded to provide additional protection against erosion of the new cover during future floods.
- Existing monitoring wells will be extended so that the top of each well casing is above the 100-year flood elevation. In addition, as part of the regrading of the borrow area, elevated mounds will be constructed to allow workers access to wells during floods. New monitoring well clusters will also be installed in these elevated mounds to facilitate access.

CONCLUSIONS: The solutions above were developed as part of the remedial design and will minimize construction delays and other short- and long-term effects of flooding. The final design meets the requirements of U.S. EPA's ROD and should allow construction to be completed within one season.

INFORMATION ON AUTHORS

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BIOGRAPHICAL SKETCHES

John Dirgo, PRC Environmental Management, Inc.

John Dirgo has a Sc.D. degree in environmental health sciences from the Harvard School of Public Health. He is an environmental scientist with 12 years of experience in a variety of air pollution and hazardous waste projects. Dr. Dirgo has managed PRC's work at the Bowers Landfill site from the start of remedial investigation activities in 1985 and has been directly involved in all work conducted at the site since that time. He has overseen design and cleanup activities at other hazardous waste sites and is involved in several ongoing projects under U.S. EPA's Superfund Innovative Technology Evaluation (SITE) Program.

Bhupen Gandhi, PRC Environmental Management, Inc.

Bhupen Gandhi has a M.S. degree in civil engineering from the University of Wisconsin and is a Registered Structural Engineer in Illinois. Mr. Gandhi's background consists of over 25 years of structural design experience in diverse fields such as institutional and commercial buildings, industrial structures, water and sewage treatment plants, nuclear power plants, pharmaceutical and food processing plants, and highway bridges. Mr. Gandhi is currently involved in RI/FS, construction oversight, and RD/RA work at several Superfund sites. He has overseen landfill closure and capping activities at both RCRA and Superfund sites.

Donna Stroka, PRC Environmental Management, Inc.

Donna Stroka has two years experience as an environmental engineer working on a variety of hazardous waste projects. Ms. Stroka has worked as a member of the Bowers Landfill design team for most of that period. Her responsibilities included sampling ground water and soil gas at the site, managing ground and aerial survey subcontractors, preparing portions of the landfill cap design, and estimating quantities of materials needed for the cap. Ms. Stroka also prepared the operation and maintenance plan and developed a construction quality assurance plan for remedial action activities at the site.

Andrew Suminski, PRC Environmental Management, Inc.

Andrew Suminski has over 20 years of design experience in water and wastewater treatment plants, collection systems, pumping stations, and water distribution systems. Mr. Suminski also has extensive experience in construction management and construction inspection. His responsibilities during the design of the Bowers Landfill remedial action included writing specifications, designing the landfill cap and site grading plan, preparing the construction cost estimate, and developing bidding documents. In addition to Bowers Landfill, Mr. Suminski has been the lead design engineer on two other Superfund sites.

David Wilson, U.S. Environmental Protection Agency, Region 5

David Wilson has been the U.S. EPA's Remedial Project Manager for the Bowers Landfill Superfund site since the signing of the Record of Decision in March 1989. He has been with the Agency for seven years, four years in the RCRA Permit Section and the past three years in CERCLA. His RCRA experience includes extensive work with land disposal units, including design and installation of landfill covers. His CERCLA experience includes the completion of remedial action at another Superfund site, the New Lyme Landfill in Ashtabula County, Ohio.